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**A SYSTEM AND METHOD FOR ELECTRONICALLY
ESTIMATING TRAVEL COSTS**

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CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority of U.S. Provisional Patent Application No. 60/176,680 filed on January 18, 2000, the entire contents of which are hereby incorporated herein by reference.

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BACKGROUND OF THE INVENTION

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With the advancement of the Internet, electronic travel agencies for searching and booking airline tickets have become common. With more and more hotels and car rental agencies joining the ranks of e-commerce, a complete travel product package can be determined and booked without physically speaking to a travel agent. Presently, the booking of travel products over the Internet requires a user to input their exact requirements in terms of time and date of travel, destinations, types of hotels at which the user wishes to stay, etc. After the user inputs their exact requirements, the system searches through one or more databases and comes up with available products that satisfy the user's exact requirements and prices for the available products. Although the system may satisfy the needs of a customer based on the input requirements, this is not equivalent to customer interaction with a live travel agent.

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Usually, when a customer interacts with a live travel agent, customer needs are determined through an interactive set of questions and answers, and some of the requirements are actually indeterminate and vague, subject to modification. For example, the customer may leave either on Friday or Saturday, but may have a preference for one of the two days. Depending on the price difference between the two days, the customer might choose one day over the other due to the price difference. A live travel agent is able to search and provide optimized travel packages in

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1 a way that current Internet-based electronic travel agencies
cannot.

5 There remains a need for an Internet-based electronic travel
agency to provide a means of finding out prices of travel
products similar to those requested by a customer, as well as the
price variations of each, and to present various options to a
customer for the customer to choose from.

10 SUMMARY OF THE INVENTION

This invention, according to an embodiment, discloses a system and method by which a customer inputs desired travel product information. Once desired travel product information is received from a user the received information is used to search through a travel product database to determine the cost of the desired travel products. Once the cost of the desired travel products is obtained, the cost of each travel product is reported to the user. The user is also prompted to view alternative travel products. If a request to view alternative travel products is received, then a discount database is accessed in conjunction with travel products databases, and the initial user travel product request, to select alternative travel products. Alternative travel products are then selected and reported to the user.

In an embodiment, a user is prompted to select an airline departure date, a departure location, a destination location, and a seat class. The user is also prompted to enter a hotel location and a number of nights to reside at the hotel. Furthermore, a user is prompted to select a rental car location and a number of days a rental car will be rented. As an alternative to the user entering the number of nights to reside at the hotel and the number of days a rental car will be rented, the duration of time between the airplane departure date and the airplane return date may be used. Therefore, the number of days a rental car will be rented may be automatically changed when the

1 flight information is changed. As an alternative to the user
 entering the hotel location and the rental car location the
 airplane destination city may be used. Therefore, the hotel
5 location and the rental car location may be automatically changed
 when the flight information is changed.

10 In another embodiment of the present invention, a user may
 select cruise travel products in conjunction with airplane, hotel
 and car rental travel products. A user is prompted to enter
 cruise product request information including a cruise departure
 date, a cruise departure location, a cruise destination location,
 a cruise return date, and a cruise passenger class.

15 In an embodiment, when displaying travel products, the
 system displays estimated prices for each travel product based
 upon availability of products from different product providers.
 The travel product display also has an estimated total price for
 all of the requested travel products.

20 In an embodiment, the user is prompted to request
 alternative travel product information. In response to a request
 for additional travel product information, a discount database
 is accessed to determine alternative travel products to offer the
 user. The alternative travel products are found by altering at
 least one of the departure flight city, the departure flight
 date, the destination city, the return flight date, the number
 of nights of hotel rental, the type of hotel rented, the number
 of days of car rental, and the type of car rented to conform to
 the requirements of at least one discount found in the discount
 database. In an alternative embodiment, alternative travel
 product information is automatically found and displayed for a
 user.

25 In an additional embodiment of the present invention, once
 a user has selected a set of travel products which meets their
 needs, the user is prompted to purchase the selected travel
 products. If the user elects to purchase the selected travel
 products, then the user is prompted to enter personal information

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1 and payment information to initiate the purchase. Once the
personal and payment information is obtained from a user, or from
prior account information maintained for the user, the system
5 contacts the travel product provider and reserves and purchases
the selected travel products.

BRIEF DESCRIPTION OF THE DRAWINGS

10 These and other features and advantages of the present invention will be better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings wherein:

15 FIG. 1 is a block diagram showing the relationship of parts of a system for estimating travel costs in accordance with one embodiment of the present invention;

FIG. 2 is a block diagram of a system for estimating travel costs in accordance with an embodiment of the present invention;

20 FIG. 3 shows the contents of a database of airline flight prices according to an embodiment of the present invention;

25 FIG. 4 shows the contents of a database of airline flight discount criteria and statistics according to an embodiment of the present invention;

FIG. 5 shows the contents of a database of hotel information and prices according to an embodiment of the present invention;

25 FIG. 6 shows a database of hotel discounts according to an embodiment of the present invention;

FIG. 7 shows a database of car rental prices and information according to an embodiment of the present invention;

30 FIG. 8 shows a database of car rental discount information according to an embodiment of the present invention;

FIG. 9 shows a user interface for user entered information according to an embodiment of the present invention; and

35 FIG. 10 shows the results presented to a user according to an embodiment of the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

An overview of an embodiment of the present invention is shown in FIG. 1. The system functions between a user device 220 and a server 222 communicating through the Internet 221. The server communicates a user interface 10 to the user device. The user device is coupled to a processor 12 within the server. The processor is in turn linked to an airline ticket statistical database 14, a hotel room statistical database 16, a car rental statistical database 18, and a discount database 19. Once travel product attributes are entered into the user interface 10 by a user, the user interface communicates with the processor 12. The processor retrieves relevant airline ticket price information and schedule information from the airline ticket statistical database 14. The processor 12 also obtains price and attribute information about hotel rooms from the hotel room statistical database 16. Furthermore, the processor receives car rental price and attribute information from the car rental statistical database 18. The processor then receives information from one or more discount databases to find alternative travel products.

FIG. 2 shows a block diagram of a typical Internet client/server environment used by the users and servers in one embodiment of the present invention. User devices 220a-220n used by the users are connected to the Internet 221 through communication links 233a-233n. Optionally, a local network 234 may serve as the connection between some of the user devices 220a-220n, such as the user device 220a and the Internet 221. Servers 222a-222m are also connected to the Internet 221 through respective communication links. Servers 222a-222m include information and databases accessible by the user devices 220a-220n. In one embodiment of the present invention, databases for storing travel product information reside on at least one of the servers 222a-222m and are accessible by users using one or more of the user devices 220a-220n to obtain travel product information.

1 In an alternative embodiment of the present invention, the travel product databases are stored on a Global Distribution System 240. Travel product information, including current travel prices and availability, is gathered from travel product providers and stored on the Global Distribution System 240. The Global Distribution System 240 is accessible by at least one of the servers 222a-222m through the Internet.

5 In yet another alternative embodiment, the travel product databases are stored on computers of the individual travel product providers. Each of the travel product databases stored on computers of the individual travel product providers contains travel product information, including current prices and availability. The databases stored on computers of the individual travel service providers are accessible by at least one of the servers 222a-222m through the Internet.

10 In one embodiment of the present invention, each of the user devices 220a-220n typically includes a central processing unit (CPU) 223 for processing and managing data; and a keyboard 224 and a mouse 225 for inputting data. A main memory 227 such as a Random Access Memory (RAM), a video memory 228 for storing image data, and a mass storage device 231 such as a hard disk for storing data and programs are also included in a typical user device. Video data from the video memory 228 is displayed on a Display screen 230 by a display adapter 229 under the control of the CPU 223. A communication device 232, such as a modem, provides access to the Internet 221. Optionally, one or more of user devices 220a-220n may be connected to a local network 234. An Input/Output (I/O) device 226 reads data from various data sources and outputs data to various data destinations.

15 Servers (hosts) 222a-222m are also computers and typically have architecture similar to the architecture of user devices 220a-220n. Generally, servers differ from the user devices in that servers can handle multiple telecommunications connections at one time. Usually, servers have more storage and memory

1 capabilities, and higher speed processors. Some server (host) systems may actually be several computers linked together, with each handling incoming web page requests. In one embodiment,
5 each server 222a-222m has a storage medium 236a-236m, such as a hard disk, a CD drive, or a DVD for loading computer software.

When software such as the software responsible for executing the processes in FIGs. 1 and 3 to 10 is loaded on the server 222a, an off-the-shelf web management software or load balancing software may distribute the different modules of the software to different servers 222a-222m. A server may utilize an operating system such as DOS, Microsoft Windows, or Linux. The server may use off the shelf, or open source software to generate and serve web pages. In an embodiment, the server uses Apache server software to generate and serve web pages. The page generating software generates web pages that have, for example, hypertext markup language (HTML) and Javascript components. Additionally, the server may be protected from unauthorized access by the use of a firewall, such as one produced by Checkpoint.
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Therefore, in one embodiment, the computer program responsible for executing the present invention resides on one or more servers. Databases to carry out the processes of FIGs. 1 and 3 to 10 may be created, maintained and edited in many different types of database software including Access, FoxPro, and Oracle. In one embodiment of the present invention the database software is made by Oracle.
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An exemplary web site location 235 is shown on server 222a in FIG. 2. The web site 235 is the user interface for accessing the database described below. The web site 235 has a unique address that is used by the users to access server 222a (in this example) and the web site location on the server 222a. The computer software for executing the processes of the present invention may also reside on the web site 235.
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FIG. 3 shows a representative portion of the airline ticket statistical database 14. As shown in FIG. 3, an airline
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1 statistical database, according to an embodiment of the
invention, contains several different fields. Those fields
5 include the departure location 20, the arrival location 22, the
minimum price 24, the maximum price 26, and the seat class of the
entry 28.

10 Additionally, the airline ticket statistical database may
contain fields for specific dates and days. In an embodiment,
the minimum and maximum prices reflect a range that has been
15 obtained by viewing the different prices offered by each airline
travel provider, for a particular departure location, arrival
location and seat class for a specific day and time period. In
an additional embodiment, the airline ticket statistical database
may contain information about the meals, movies, and consumer
15 ratings for each flight, which may be communicated to a user, to
help them select a flight.

20 In yet another additional embodiment, the processor accesses
the databases of each airline travel provider at the time the
user enters their request for travel products. The processor
searches the databases of the airline travel providers using any
25 relevant information provided by the user, such as the date of
departure, city of departure, destination city, and return date.
The processor then computes a range of prices from a minimum
price to a maximum price, based on the prices found for flights
that satisfy the user's travel product request. Searching travel
product provider databases at the time of the user's travel
product request, based on the parameters of the user's request,
may be done for additional travel products, such as those
discussed below.

30 FIG. 4 shows a representative database for airline ticket
discount information. As shown in FIG. 4, the representative
database may contain a field with the discount description 30,
a field for the minimum percentage price discount for a given
discount description 32, and a maximum percent discount for a
35 given discount description 34. Representative discounts may

1 include a discount for round-trip tickets that have a weekend
5 night in between, because the hotels may compensate the airlines
for encouraging their passengers to spend a weekend night at the
hotel.

10 Representative discounts may also include, for example,
15 advanced ordering tickets, such as those ordered 21 days in
advance, or 7 days in advance. Furthermore, discounts may be
given for ordering non-refundable tickets. The percentage of
savings varies depending on the type of discount. The discounts
20 for more than one discount acquiring behavior may in some
instances be combined for greater savings. In an additional
embodiment of the present invention, after the user enters
requested flight information, various airline companies are
25 contacted to determine whether one or more airline companies are
offering special discounts that are applicable to the requested
flight. Discounts often range between airlines in terms of a
discount percentage value of the normal flight price. The range
30 is reflected in the minimum and maximum discount percentage rate
for each type of discount.

35 In an alternative embodiment, the processor selects flight travel products by searching through the global distribution server, and possibly through travel product databases stored by individual travel product suppliers, to find alternative flight travel products. In an embodiment, the processor alters the desired flight travel product characteristics and searches based on the new characteristics. Alternatively, the processor searches the travel product databases for flight travel products having characteristics within a predetermined variation from the requested flight travel products. Preferably, the global distribution server and the individual travel product provider databases contain information regarding the discounts that each flight travel product is taking advantage of. Thus, the processor can determine the applicable discounts and communicate them to a user.

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FIG. 5 shows an exemplary database of hotel information. The hotel information kept may include the city in which the hotel is located 40, and the ranking of the hotel in terms of the number of stars that it has received in guide books 42. Additional information about hotels may include the number of beds in the hotel room 44. As part of the hotel room information, the minimum price 46 for hotel rooms of hotels of a specified number of stars with a specified number of beds in a specified city. The database also contains a maximum price for a hotel of a given number of stars containing a specified number of beds in a specific city 48. In an embodiment of the present invention, the minimum and maximum prices are obtained by analyzing several different hotels with the specified number of stars and beds. In an additional embodiment, the hotel information database may contain additional information, such as whether the rooms in the hotel have cable television and whether the hotel has air conditioning which may be communicated to a user to help them choose a hotel.

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Additionally, the hotel information database may contain fields for specific dates and days. In an embodiment, the minimum and maximum prices reflect a range that has been obtained by viewing the different prices for particular hotel rooms in a city for various day and time periods to determine fluctuations in price.

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FIG. 6 shows a database with discount information for hotel rooms. A hotel room discount database according to an embodiment of the present invention may include a discount description field 50, the minimum percentage discount that a particular discount will afford 52, and the maximum percentage discount that a given discount description will afford. For example, if a hotel room is rented for one week, often a weekly rate discount applies. Additionally, hotels often provide discounts for convention patrons, and for travel club members. The rate discounts often range in terms of a discount percentage value of the normal hotel

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1 room price from hotel to hotel. This is why there is a range of
minimum to maximum discounts listed for each type of discount.
In an additional embodiment of the present invention, after the
5 user enters requested hotel information, or after necessary hotel
information is gleaned from the flight destination and the time
between the departure flight and the return flight, various hotel
companies are contacted to determine whether one or more hotel
companies are offering special discounts that are applicable to
10 the requested hotel.

In an alternative embodiment, the processor selects hotel travel products by searching through the global distribution server, and possibly through travel product databases stored by individual travel product suppliers, to find alternative hotel travel products. In an embodiment, the processor alters the desired hotel travel product characteristics and searches based on the new characteristics. Alternatively, the processor searches the databases for hotel travel products having characteristics within a predetermined variation from the requested hotel travel products. Preferably, the global distribution server and the individual travel product provider databases contain information regarding the discounts that each hotel travel product is taking advantage of. Thus, the processor can determine the applicable discounts and communicate them to a user.
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FIG. 7 shows a representative car rental statistic table. A car rental statistical table according to an embodiment of the present invention contains the city in which the car will be rented 60. The auto rental database also contains the type of car that is being rented, for example, full size, medium size, and compact size. The table also contains a minimum price for a given size car in a specified city 64, as well as a maximum price for a given size car in a specified city. For example, a full size car in the city of New York may cost between a minimum price of \$60 per day and a maximum price of \$70 per day.
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1 Additionally, the car rental statistical database may
5 contain fields for specific dates and days. In an embodiment,
 the minimum and maximum prices reflect a range that has been
 obtained by viewing the different prices for particular rental
 car types in a given city for different given day and time
 periods.

10 FIG. 8 shows an exemplary discount table for auto rentals.
15 The discount table for auto rentals according to an embodiment
 of the present invention contains a description of the discount
 70. The table also contains fields for the minimum percent price
 discount for a given discount description and a maximum
 percentage price discount for a given discount description. For
 example, often auto rental companies provide discounts for those
 rental customers who rent a car for one week or more. Often the
 percentage of discount from the daily rate that is afforded to
 a customer who rents a rental car for more than one week varies
 by company from a minimum percentage discount to a maximum
 percentage discount. In an additional embodiment of the present
 invention, after the user enters requested car rental
 information, or after necessary car rental information is gleaned
 from the flight destination and the time between the departure
 flight and the return flight, various car rental companies are
 contacted to determine whether one or more car rental companies
 are offering special discounts that are applicable to the
 requested car rental.

20 In an alternative embodiment, the processor selects car
 rental travel products by searching through the global
 distribution server, and possibly through travel product
 databases stored by individual travel product suppliers, to find
 alternative car rental travel products. In an embodiment, the
 processor alters the desired car rental travel product
 characteristics and searches based on the new characteristics.
 Alternatively, the processor searches the databases for car
 rental travel products having characteristics within a

1 predetermined variation from the requested car rental travel
products. Preferably, the global distribution server and the
individual travel product provider databases contain information
5 regarding the discounts that each car rental travel product is
taking advantage of. Thus, the processor can determine the
applicable discounts and communicate them to a user.

FIG. 9 shows a user interface that is presented to the user
of the present system according to an embodiment of the present
10 invention. As shown in FIG. 9, a user is prompted to enter a
departure location for an airline flight 76, as well as the
departure date 77. A user is also prompted to enter the arrival
destination city for the airline flight 78, as well as the date
that they wish to return to the departure city 79. Below the
15 airline information, the user is prompted to enter hotel
information.

A user may enter the hotel information by selecting a given
star categorization of a hotel 80. As shown in FIG. 8, the
hotels may be subdivided into five-star hotels, four-star hotels,
three-star hotels, and two-star hotels. In an embodiment of the
20 present invention, the city in which the hotel is located is
obtained from the user's selection of an airplane destination
city. In an alternative embodiment, the user is prompted to
enter the city in which the hotel is located. The user is
prompted to enter the number of nights that they intend to stay
25 in the hotel room 81. Alternatively, the number of nights that
a user will stay in a hotel room is gleaned from the amount of
time between the departure flight and the return flight. In yet
another alternative embodiment, the user is prompted to enter
more than one hotel with arrival and departure dates, and city
30 locations for each.

In addition to airlines and hotel rooms, a user is also
prompted to enter car rental information. For example, the car
rental information may be a choice between different sizes of
35 cars 82, such as full, medium, or compact cars. The user is

1 prompted to enter the number of days which they wish to rent a
5 car 83. Alternatively the number of days for which a user wishes
to rent a car may be obtained from the amount of time between the
departure flight and the return flight. Alternatively, a user
is prompted to enter more than one car rental along with the
locations and duration of each rental.

In an embodiment of the present invention, the user
10 interface is interactive, so that once a user selects, for
example, a departure city, a return city, the departure and
return dates, and seat class for their airline flight, the system
displays the estimated price range of the airline flight for the
15 user 84. Likewise, once the user has entered the destination
city for the airline flight, the type of hotel they wish to
occupy, the type of room that they want, and the length of stay,
the system generates an estimated hotel cost 85. Once the user
has entered an airline destination city and chosen the type of
20 car that they wish to rent, as well as the duration of the car
rental period, the system estimates the car rental price for the
user 86.

As the system estimates the prices for the airline tickets,
the hotel, and the car rental, the system also displays a total
price estimate for the user 87. In an embodiment, airlines,
25 hotel rooms, and car rentals each have a range of prices going
from a minimum to a maximum, and each of the airline tickets, the
hotel rooms and the auto rentals may be added up to get a range
of minimum to maximum overall trip prices. Alternatively, a
root-mean-square method, or other statistical method to give less
30 weight to the extremes of the individual ranges, is used to
calculate the overall range in the total price estimate.

In an alternative embodiment, only the lowest priced travel
products found having the desired characteristics are displayed.
Likewise, the total price given to the user is calculated by
adding up the lowest price individual travel products. In yet
35 another alternative embodiment, the actual prices and information

1 about each travel product having the desired characteristics are
5 displayed, rather than a range of prices.

In an embodiment of the present invention, the prompting screen contains a button 88 that the user can press to submit a request for alternative travel products to take advantage of discounts based upon the information already entered. If a user selects the alternative suggestion button on the user interface, the system generates a list of one or more alternative travel products for the user. An alternative list is shown in FIG. 10. FIG. 10 shows a departure location for an airline 90, an arrival location for an airline 92, a departure date and time 94, and a return date and time 96. Additionally, the alternative suggestion generated for the user displays a hotel classification 98, and room information 100 as well as a car rental description 102. The alternative suggestion displayed to the user also contains a total estimated price 104. Finally, the alternative suggestion displayed for the user contains a category entitled "Savings" 104, in which the steps taken to lower the cost of the travel are detailed for the user. For example, the alternative suggestion may propose a lower total price if the user is willing to depart 1 day earlier to capture a Saturday night stay discount. The lower total price may be the result of a cheaper airline flight, even though the hotel and car rental prices may increase.

In an alternative embodiment of the present invention, the system automatically generates and displays a list of one or more alternative travel products for the user. The alternative list is forwarded to a user along with a list of travel products that satisfy their request parameters. The list of travel products may take the same form as the list shown in FIG. 10 and previously described.

In another alternative embodiment of the present invention, the user inputs a departure city, a departure date, a destination city, and a length of stay. The various inputs may be general

1 for example, a departure or destination state, as well as a
desired month of departure. In an additional embodiment, the
user also inputs how flexible they are with regard to at least
5 one of the departure city, departure date, destination city and
length of stay. The user may input limited information and the
processor may explore many alternatives. For example, a user can
enter the departure city, destination city, and the price they
wish to spend. Once the trip information is entered by a user,
10 the processor runs numerous permutations to determine different
prices for different options. The processor generates a user
interface presenting the different options to the user along with
dates, flight, hotel and car rental information for each option.

If, for example, the user enters that they wish to travel
15 from Los Angeles to new York for 5 days in February and would
like to stay within in a budget of \$1,000, then the user enters
the information and leaves any other input boxes empty. The
processor then searches the databases, and using an optimization
20 scheme, such as linear programming, determines all of the options
that fit the user's parameters. If there are many permutations
then the permutations may be listed from lowest price to highest
price. If there are no permutations that fit the request, the
system proposes the closest permutation for the users education.

Once a travel product list is displayed for a user, a user
is prompted to purchase any or all of the travel products offered
25 to them. For example, a user is prompted to purchase airplane
flights that fit within the requested travel product parameters.
If the user elects to make a purchase, then the user is prompted
for their personal information and payment information so that
30 the processor may contact the selected travel product sellers to
make the requested reservations and purchases.

In should be realized that the above travel products are
only representative and that the system and method are applicable
to other types of travel products. In an embodiment, the user
35 may request cruise travel products. A user selects a cruise by

1 entering a cruise departure date, a cruise departure location,
a cruise destination location, a cruise return date, and a cruise
passenger class. In an additional embodiment, the user may elect
5 train travel products. A user selects a train trip by entering
a departure date, a departure location, a destination location,
a return date, and a passenger class. In another embodiment the
user may elect travel activity products such as scuba diving,
snorkeling, and safari tours.

10 The preceding description has been presented with reference
to presently preferred embodiments of the invention. Workers
skilled in the art and technology to which this invention
pertains will appreciate that alterations and changes in the
described structure may be practiced without meaningfully
departing from the principle, spirit and scope of this invention.
15 Accordingly, the foregoing description should not be read as
pertaining only to the precise system and method described and
illustrated in the accompanying drawings, but rather should be
read consistent with and as support for the following claims,
which are to have their fullest and fairest scope.

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